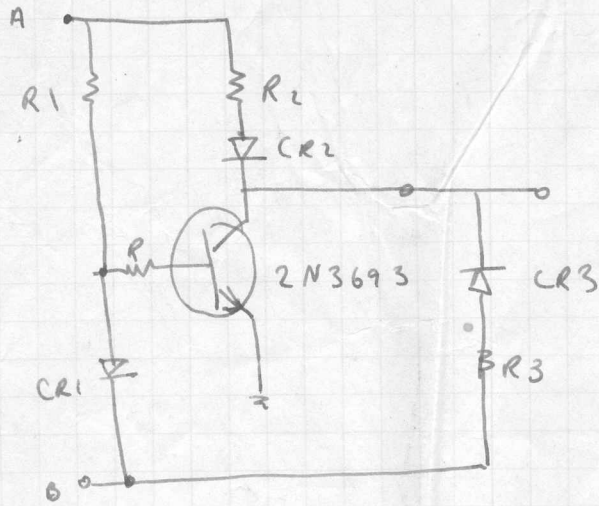


# XOR without power supply



All diodes D31

A - "0" B - "1" CR1 & CR2 reversed bias

Q1 does not conduct  $\rightarrow$  out "1"

A - "1" B - "0" CR3 revers. Current through R1 is shunted to ground & Q1 is off.

A - "1" B - "1" CR1 reverse biases & Q1 conducts  $V = 0$

$$I_L = \frac{V_{out}}{R_L}$$

from load.

$$R_2 = R_3 = \frac{V_{in} - V_D - V_{out}}{I_L}$$

$$I_C(Q_1) = \frac{V_{in} - V_D - V_{CE sat}}{R_L \parallel R_3}$$

$$R + R_1 = \frac{V_{in}}{I_C(Q_1) / h_{FE}}$$

$$R_1 \gg \frac{V_{in}}{I_C(Q_1) / h_{FE}}$$

Nov. 8 1973